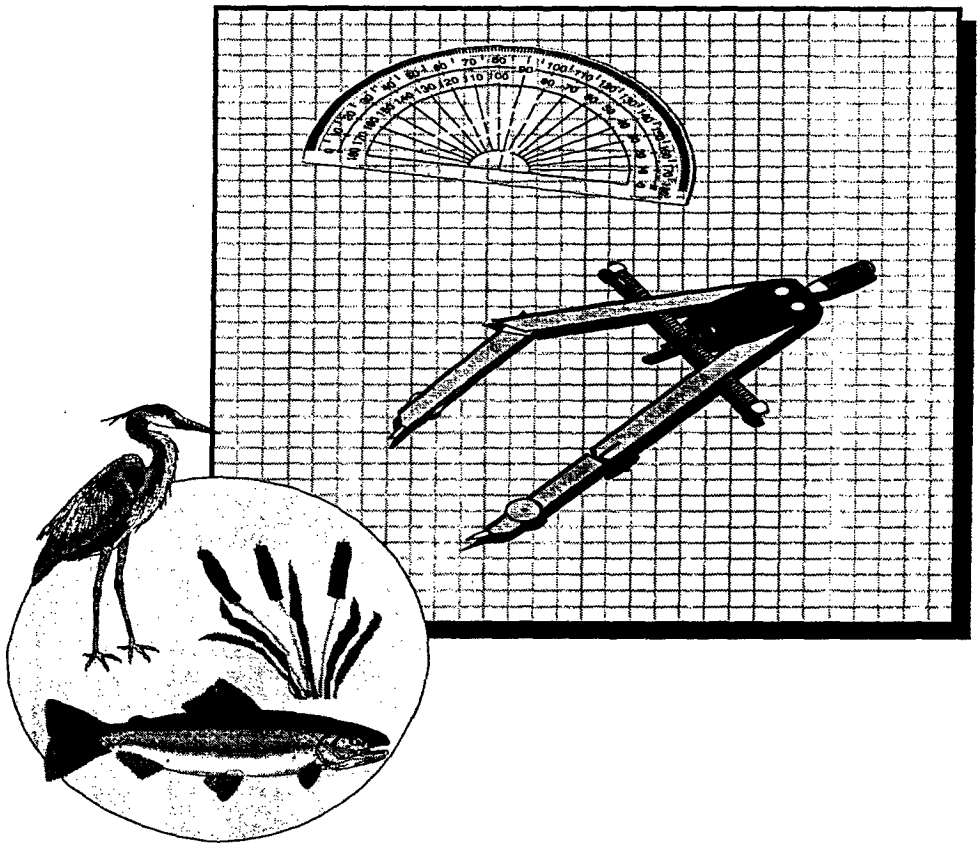
Developing a Strategic Plan for Ecosystem Restoration



CALFED
BAY-DELTA
PROGRAM

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For Discussion

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DEVELOPING A STRATEGIC PLAN FOR ECOSYSTEM RESTORATION

Overview

The mission of the CALFED Bay-Delta Program is to develop a long-term comprehensive plan that will restore ecosystem health and improve water management for beneficial uses of the Bay-Delta system. The draft Ecosystem Restoration Program Plan (ERPP) was developed to contribute to restoration actions and ensure attainment of ecosystem health. The foundation of the draft ERPP is restoration of ecological processes that are associated with streamflow, stream channels, watersheds, and floodplains. These processes create and maintain habitats essential to the life history of species dependent on the Delta.

This document is companion to the March 1998 ERPP draft volumes I and II (Visions for Ecosystem Elements and Ecological Zone Visions). Its purpose is to describe the status and process for developing a Strategic Plan for the Ecosystem Restoration Program (ERP) and revising volume III. The *Strategic Plan* is a work in progress which, when complete, will articulate an integrated planning and scientific framework to guide the implementation of the ERP. The *Strategic Plan* will build on *Volume III, Vision for Adaptive Management* (Draft working paper, August 28, 1997). That volume was prefaced by the following:

> *The importance of adaptive management to the ERPP has become increasingly apparent in recent months as we developed Volumes I and II and as we worked to provide this draft of Volume III. We firmly believe that an effective ecosystem restoration program is one that has the support of the participating agencies, stakeholders, interested individuals, and local landowners. We view the refinement of Volume III and the development of an effective adaptive management program as the glue which will hold the ERPP together during the next 25 years and guide our ecosystem restoration plan implementation.*
>
> *Therefore, we present Volume III as our very first cut at describing the adaptive management process with important sections that address implementation, monitoring, indicators, and research. We have much work to do in refining this volume and during the refinement process we need to make certain it reflects the needs and desires of the participating*

agencies and our urban, agricultural, and environmental stakeholders as well as affected landowners and interested individuals.

The perception of the value and importance of strategic planning and adaptive management has not lessened, and based on interest and suggestions by a wide variety of interests, has greatly increased. The Scientific Review Panel, CALFED agencies and stakeholders strongly recommend that CALFED prepare a clear, easily understood document that describes the planning and implementation methodology. Consistent with our earlier determination and these recommendations, we are moving forward with a process to develop a holistic and broad-based *Strategic Plan.* The *Strategic Plan* effort will be an important adjunct to the ERP, and will provide the introductory and background materials not present in the ERP. The *Strategic Plan* will meld all the components into a rigorous adaptive management program. The *Strategic Plan* will provide concise ecological problem statements, present a group of ecological principles to be applied to the ERP, and provide a revised landscape ecosystem classification and descriptions to overlay existing descriptions of ecosystem elements and ecological zones presented in Volumes I and II.

A plan is nothing; planning is everything.

--Sir Winston Churchill

The *Strategic Plan* development process will enable CALFED staff, agencies, stakeholders and other interested parties to work collaboratively to address outstanding issues, refine the ERPP, and successfully implement the ERP. The *Strategic Plan* will be developed with assistance from a Core Team of consultant scientists, CALFED staff, agency experts, advising scientists, stakeholders, and members of the public.

The *Strategic Plan* is the guidance document for CALFED ecosystem restoration programs including the ERPP, Near-Term Restoration, and the CALFED State and Federal Endangered Species Act Compliance Strategy. The *Strategic Plan* will enable the development of an implementation strategy for the ERPP.

All of the elements of the CALFED long-term solution will have implementation strategies which will be integrated into a master implementation strategy.

Purpose of the Strategic Plan

The purpose of the *Strategic Plan* is to clearly articulate an integrated planning and scientific framework by which to successfully implement and evaluate restoration of the large and complex Bay-Delta ecosystem. The *Strategic Plan*

will provide a comprehensive plan of action that will guide proposed restoration actions during development, revision, implementation, and post-implementation periods. The urgency to rehabilitate the ecosystem can be met by addressing scientific uncertainty and proceeding with a scientifically defensible *Strategic Plan.*

Strategic Plan Purposes

- Develop a clear and concise ecological planning framework for goals and actions.
- Develop a rigorous scientific framework to evaluate, support, revise and implement proposed actions.
- Ensure consistency with other CALFED programs, especially Restoration Coordination and the Conservation Strategy for species and habitats .
- Provide an avenue to incorporate the concerns and input of agencies, stakeholders and the general public.

One of the primary criticisms of the draft ERPP by the public and the Scientific Review Panel is that the plan did not present a clear restoration strategy integrated across the proposed implementation objectives and programmatic actions. The *Strategic Plan* is designed to rectify this inadequacy by providing a clear restoration strategy supported by improved scientific information that will be tested and modified through adaptive management and ultimately presented in a programmatic implementation plan.

Preparation of the Strategic Plan

CALFED staff and a group of interested stakeholders have begun preliminary work to develop a process for strategic planning. This joint stakeholder-agency effort has prepared a draft outline for the *Strategic Plan.* We are also working on a process to coordinate an Ecosystem Science Program, a formal, long-term scientific review program for CALFED Bay-Delta restoration efforts. We have begun recruiting a team of scientists from the Science Program to assist in the preparation of the *Strategic Plan.* This core team of scientists will also participate in public, technical workshops to address some of the complex scientific issues that must be resolved in the *Strategic Plan.* In consultation with the BDAC Ecosystem Restoration Work Group (ERWG), a scope of work has been written and will be further discussed with ERWG at various stages along the way.

Who Will Be Involved

A broad spectrum of participants is required in the planning, evaluation, and implementation of the *Strategic Plan.* Stakeholders are invited to participate through the meetings of the BDAC ERWG. There will be periodic meetings of this Work Group to solicit input and report progress on the plan. There will also be issue-specific technical workshops with a variety of scientists and technical experts in attendance.

When Will the Strategic Plan Be Completed

The objective is to have a review draft of the *Strategic Plan* available by June 1998, and a target date for completion is August 1998. Draft chapters of the report will be available for public review throughout the next six months.

Strategic Planning Workshops

The development of the *Strategic Plan* must take place in an open forum with full access to all agencies and stakeholders who desire to contribute to the design of the plan. We plan to host several Strategic Planning workshops to fully scope the issues and concerns regarding the structure and content of the Strategic Plan. This process will be under the guidance of the Bay-Delta Advisory Committee, a formal committee established under the auspices of the Federal Advisory Committee Act (FACA). This venue will further insure that this important element of the overall CALFED program is consistent with Federal law.

Regional Strategic Plans

The *Strategic Plan* is envisioned as providing the broad landscape setting for attaining the targets presented in the ERP. This will be accomplished by the combined efforts of the Ecosystem Science Program and Adaptive Management.

Implementation of the specific actions will be further guided by locally developed strategies for implementation.

Components of the Strategic Plan

Development of the *Strategic Plan* will require resolution of many issues related to the selection and implementation of restoration actions presented in the ERP. The major issues and areas of concern follow:

- Scientific Uncertainty
- ERP Science Program
- Conceptual Ecosystem Models
- Testable Hypotheses
- Adaptive Management
  - Indicators of Ecological Health
  - Focused Research
  - Ecosystem Monitoring
  - Implementation Phasing
- Implementation Management

Scientific Uncertainty

One of the main difficulties facing ecosystem restoration is failure to adequately address scientific uncertainty prior to implementing actions. That is to say, restoration actions are designed and implemented with the inherent (but often unstated) assumption that an action will provide the ecological benefit for which it is being implemented.

Class	Description
◆	Target for which additional research, demonstration, and evaluation is needed to determine feasibility or ecosystem response.
◆◆	Target which will be implemented in stages with the appropriate monitoring to judge benefit and success.
◆◆◆	Target that has sufficient certainty of success to justify full implementation in accordance with adaptive management, program priority setting, and phased implementation.

The ERP presents a formidable number of restoration actions, designed to improve the ecological health of the Bay-Delta system, and has made an attempt to assign levels of scientific certainty to targets presented in Volume II: Ecological Zone Visions. The target

classification system used in Volume II is in the text box to the left.

In this context, the ERP attempts to address scientific certainty by identifying actions that have a sufficiently high certainty of success that they should be implemented. At a lower level, some actions have been identified as feasible for implementation on a small-scale and then evaluated on the results of monitoring to determine if the project provided the anticipated ecological benefits. At the lowest level, many actions have been proposed which may provide an ecological benefit, but which have little data to support the benefits assumption.

Ecosystem Science Program

The Ecosystem Science Program is a long-term program that will provide technical and scientific input for Bay-Delta restoration activities. This three-tiered ecosystem science program will provide a conduit for multiple levels of scientific input needed to address complex scientific issues in order to develop, implement, and assess CALFED ecosystem restoration activities.

In the first tier of the Science Program scientists and experts will be recruited to assist CALFED in the development of the *Strategic Plan.* This team will include experts in a wide variety of scientific disciplines including ecological modeling, landscape ecology, conservation biology, Endangered Species Act compliance, and hydrology/fluvial geomorphology. This core team of scientists will facilitate work groups and technical workshops with CALFED staff, agency experts, advising scientists, stakeholders, and the public.

The second tier is a standing science group. The standing science group is an informal assemblage of independent, agency, and stakeholder scientists who work within and outside the Bay-Delta system. The members of the standing science group will be recruited for specific experience applicable to the CALFED restoration efforts. The tier two experts will participate in focused, technical workshops facilitated by tier one scientists and CALFED staff. The scientists will review and provide input on monitoring and research findings, indicators, models and testable hypotheses, ESA compliance strategies, the adaptive management strategy, and other work prepared by the Core Team.

The third tier is the wholly-independent Scientific Review Panel. We will host another workshop of the Scientific Review Panel this Summer or Fall to review the *Strategic Plan.*

Scientific Review Panel

In October of 1997, a Scientific Review Panel was convened to assess and evaluate the scientific validity and rationale of the scientific concepts contained in the draft ERPP. The Scientific Review Panel recommended the incorporation of conceptual models early and prominently into the draft ERPP. The Panel emphasized the need for large-scale qualitative models, models that are focused geographically and also simulation models of processes such as fluvial geomorphology. A whole series of integrated physical and biological models is essential to a science-based adaptive management program. Because there is uncertainty whether restoring a given physical process will achieve the draft ERPP's restoration or rehabilitation goals, conceptual models need to include alternative hypotheses and alternative management actions. The Panel recommended a management procedure be developed to test the conceptual models and improve our understanding of ecosystem functions.

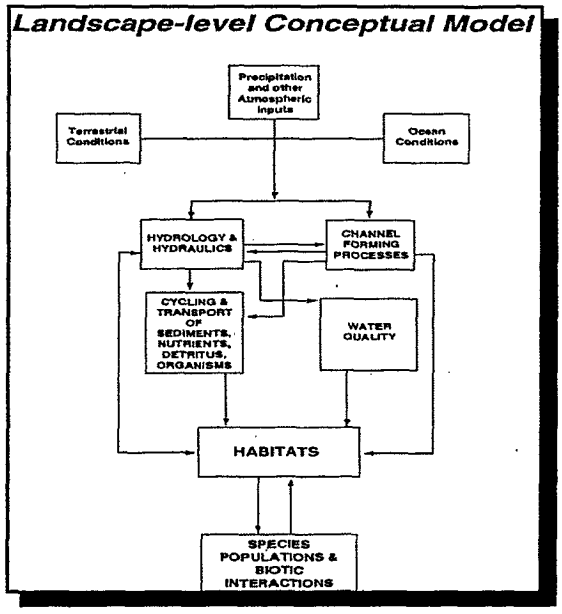
Conceptual Ecosystem Models

The ERP Indicators Work Group has begun work on conceptual models pursuant to the recommendations of the Scientific Review Panel. Ecological attributes for the Bay-Delta-River System are organized by broad elements which include: upland river-riparian systems, lowland river-floodplain systems, Delta, and Greater San Francisco Bay. These elements each encompass three or more ecological zones as described in the draft ERPP. General categories of attributes were identified (hydrologic, geomorphic, habitat, biological community, and community energetics) which reflect essential aspects of ecosystem structure and function. Understanding the ecological attributes of the Bay-Delta-River system provides a basis for developing conceptual models.

The conceptual models are designed provide as much consistency across both ecological hierarchy and geography as possible so that information can be aggregated in a variety of ways. Input by technical experts will be more easily integrated using a common format.

Landscape-scale Conceptual Model

The landscape-scale conceptual model globally depicts large-scale attributes of the Bay-Delta-River system and associated watershed. This model depicts the



structural and functional attributes which generally apply across ecosystems. Indicators developed at this scale will be based on ecological attributes such as habitat, areal extent and connectivity, habitat diversity and representativeness, and hydrologic and sedimentation regime. This model will be used to integrate the ecosystem-scale models and to convey to the public the general ecological concepts and hypotheses which are the underpinnings of restoration ecology.

Ecosystem-scale Conceptual Models

Ecosystem-scale models include the Upland River-Riparian Systems, Lowland River-Floodplain Systems, and Bay-Delta Conceptual models. The attributes for the Greater San Francisco Bay and Delta have been incorporated into one conceptual model called the Bay-Delta Conceptual Model by CALFED staff. As the iterative review process unfolds it may be deemed necessary to have separate conceptual models for the Greater San Francisco Bay and Delta.

The ecosystem-scale models are based on distinctive geomorphic and hydrologic features which warrant the development of separate conceptual models. For example, upland river-riparian systems are characterized by steep confining topography with bedrock-controlled stream channels in a narrow floodplain. These systems generally occur in upper elevation watersheds above major dams in both the Sacramento and San Joaquin Valley. Hydrologically these areas are characterized by seasonal shifts in stream levels with periodic flooding. The lowland river-floodplain systems are characterized by flat, non-confining topography with a wide floodplain area which allows for active channel migration and floodplain development. These systems have seasonal shifts in stream levels with periodic flooding but also have greater hydrodynamic complexity and large groundwater basins, particularly in the Sacramento Valley.

For undammed tributaries the 300 foot contour was chosen as the dividing line between upland-river riparian and lowland- river floodplain systems. This is the approximate boundary where alluvial soils begin. Often, the location of dams and reservoirs coincides with this boundary. The difference in hydrologic attributes above and below dams warrant using this as a boundary. The uppermost extent of tidal influence was chosen as the boundary between lowland-river floodplain systems and the Delta. Finally, Chipps Island, to coordinate with the legal definition of the Delta, was selected as the boundary between the Delta and the Greater San Francisco Bay.

Indicators developed at the ecosystem-scale will include an assessment of ecological attributes such as habitat, areal extent and connectivity, habitat diversity, and hydrologic and sedimentation regime. For example, in lowland river-floodplain systems the integrity of fluvial geomorphology will be evaluated using indicators of processes such as channel meander, channel/floodplain interactions and surface/groundwater exchange.

Habitat-scale Conceptual Models

Conceptual models of habitats need to be developed to depict our current understanding of habitat structure and function. Habitat models could be used to assess technical feasibility and desirability of proposed restoration projects and to evaluate the results of restoration and management actions. A detailed riparian forest habitat model might include such attributes as hydrologic and sedimentation regime; plant composition, diversity and cover; faunal diversity; and reproduction of neotropical migrant birds. Such a model could be used to construct alternative hypotheses regarding, for example, the ecological effects of a levee setback.

Specialized Conceptual Models

Specialized conceptual models include models of individual tributaries, stream reaches, sections of rivers, biological communities, species populations and ecological processes. The Lower American River Conceptual Model is an example of a tributary model that could be used to track local system health and demonstrate the contribution of a particular waterway to landscape-level ecological integrity. The lower American River is essential to the migration, spawning, rearing and outmigration of chinook salmon. Conceptual models and indicators for the lower American River will be developed with the assistance of technical specialists having expertise on this system. For example, the Department of Fish and Game's Stream Evaluation Program, the Water Forum, and Sacramento Area Flood Control Agency technical specialists will likely be contributors to this process. While the general ecological attributes of tributaries in a particular geographic area may be the same, the individual tributary indicators and stressors will likely vary to reflect the different areas of concern for each tributary.

A Bay-Delta food-web model is an example of a biological community model which may be developed. Species population models that may be developed include population models, life-history and fish loss models.

Quantitative models of hydrology, sediment transport, and carbon budget are examples of specialized conceptual models of ecological processes.

Testable Hypotheses

Many problems arise in science where a decision must be made to accept or reject a statement regarding the ecological relationship of a specific parameter or condition. This is particularly true in ecosystem restoration. The statement in these situations is referred to as a *hypothesis*. For example, the ERP has recommended the restoration of tidally influenced aquatic habitats in the Delta to provide habitat for delta smelt. A very simple hypothesis related to this action could be stated as follows: "The delta smelt population will benefit from increased habitat for spawning."

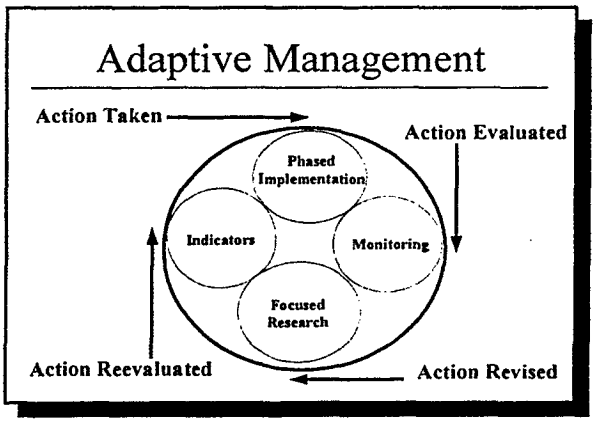
The decision-making process about the hypothesis is termed hypothesis testing. This testing would likely require the collection of data regarding delta smelt abundance, habitat preference, habitat utilization, and other environmental factors. Analysis of these data would indicate if the hypothesis was true (delta smelt benefit from additional spawning habitat) or false (delta smelt do not benefit from additional spawning habitat). In actual application, the example hypothesis is probably too simple to be evaluated and the need for scientifically testable hypotheses will drive the restoration program to very clearly articulate perceived problems and potential means by which to remedy the problems. In any case, the hypothesis must but be structured in a manner that will allow the collection of scientific data to evaluate whether the hypothesis is true or not.

Adaptive Management

No long term plan for management of a system as complex as the Bay-Delta can predict exactly how the system will respond to Program efforts, or foresee events such as earthquakes, climate change, or the introduction of new species to the system. Adaptive management acknowledges that we will need to adapt the actions that we take to restore ecological health and improve water management. These adaptations will be necessary as conditions change and as we learn more about the system and how it responds to our efforts. The Program's objectives will remain fixed over time, but our actions may be adjusted to assure that the solution is durable.

The concept of adaptive management can be illustrated as applied to the Program. A critical step of the ecosystem restoration component is to construct a comprehensive adaptive management framework that includes policy and management decision-making based on existing and newly developed scientific and technical information. To be effective, this process also needs to consider the ecological, economic, and social goals of communities, agencies, and interested parties and incorporate these distinct values into the design of the adaptive management process.

Adaptive management of ecosystem restoration has a dual nature. First, adaptive management is a philosophical approach toward restoration that acknowledges we need to better understand the Bay-Delta watershed if we are to succeed in restoring ecosystem health. It acknowledges that we will proceed with restoration efforts using existing information while we gather the knowledge that we lack. Although we know much about the Bay-Delta system (its ecological processes, habitats, and species), we do not know everything we need to successfully restore ecosystem health. The adaptive management philosophy accommodates the status of knowledge and provides an avenue to obtain the necessary knowledge (and experience) through the duration of the implementation period.



Second, adaptive management is a structured decision-making process that includes important components to identify indicators of ecosystem health (indicators); a program for monitoring indicators of ecosystem health (monitoring); a program for implementing research to gather new or additional information (focused research); a process to optimize the implementation projects through time (phased implementation); a feedback process to integrate knowledge gained from monitoring and research; and the flexibility to change the program in response to new information.

The concept of adaptive management is an essential part of other program elements as well. In every part of the program, new or more intensive actions are proposed. Along with these proposed actions comes uncertainty. What actions work best to achieve program objectives? How can these actions be modified to work better, cost less, or be simpler to implement? How should the emphasis among actions change over time? Are there new or different actions that should complement or replace those that are being implemented? An adaptive management approach helps to answer these questions.

Even within the area of adaptive management there are linkages among Program elements and opportunities for more effective action. This is especially true for the ERP and the Water Quality Program. There is a lack of conclusive information about cause and effect relationships and how much restoration is needed for a "healthy" ecosystem and good water quality. An effective adaptive management program requires the continuous examination of monitoring data to measure progress and redirect activities where necessary. The Program is currently identifying the monitoring, assessment and research needs for CALFED-related projects, actions, and activities. A Comprehensive Monitoring, Assessment, and Research Program (CMARP) is a critical component of the CALFED adaptive management strategy.

The concept of adaptive management will be developed more fully for all program components as implementation plans are developed later in Phase II of the Program.

Indicators of Ecological Health

Ecological indicators are a means to evaluate the success of restoring ecological health to the Bay-Delta-River system. Within the framework of adaptive management the indicators program will serve several important functions. Indicators will provide a relative measure of the efficacy and durability of restoration projects and management actions, in contributing to ecological rehabilitation. Evaluation of indicators program data will improve our technical understanding of the interrelationships and interdependence of processes, habitats and species within the Bay-Delta-River system. Indicators, with conceptual models, will help identify information gaps and research needs.

The ERP Indicators Work Group has now begun engaging technical experts having knowledge of particular species, habitats, and ecological processes. Technical experts will assist in the iterative process of developing conceptual models and indicators of ecological integrity for the Bay-Delta-River system.

There may be two or more sets of indicators depending on the intended purpose and audience. Because the indicators will be utilized by the public, management, and technical experts, the indicators will have varying degrees of complexity. For example, a set of indicators suited for the public may consist of just a few overarching measures of ecological health that are easily understood by the general reader whereas, a set of indicators used by the scientific community could be more esoteric and require a technical background to understand.

Once indicators are selected, a range of target values will be developed for each indicator. The targets will define levels that achieve ecological integrity or health based on our best estimate of historic states, reference conditions or other information. Indicator targets will be revisited and refined based on new information generated by the adaptive management process. Such information could include: analysis of historical conditions and processes; presence of introduced species; incorporation of natural fluctuations; and future growth and development.

Focused Research

Focused research is the use of experimental methods to answer specific questions. Consistent with scientific uncertainty and adaptive management, focused research programs will be developed to evaluate restoration opportunities and assist in directing restoration actions to areas where it will provide the greatest ecological benefit.

Ecosystem Monitoring

A comprehensive monitoring program is being developed by IEP/USGS/SFEI to assure the indicators will be measured. Evaluation of the results of the monitoring and indicators programs will require specific expertise, particularly in the early years of the restoration program. An integral portion of the evaluation should be provided by those area- and species-specific experts that helped developed the indicators. As the restoration program proceeds the linkages between attributes and the effects of stressors on the Bay-Delta-River system will become more clearly understood, providing knowledge upon which to base ecosystem management decisions. Monitoring data and the evaluation of indicators will be incorporated into the adaptive management process.

Implementation Phasing Plan

Phased implementation is an approach to implement actions identified in the ERPP. Phased implementation is comprised of a multistage priority strategy

which assists in identifying and sequencing the implementation of the ERPP restoration actions.

At the programmatic level, phased implementation provides a snapshot of potential implementation emphasis over time. A 25-year implementation period is selected to display one potential variation in emphasis grouped within five 5-year increments. The present assessment of emphasis over the life of the program is based on existing knowledge and assumptions regarding the need for certain types of actions.

Phased implementation within the shorter term 5-year implementation programs will be modified on a recurrent basis as a result of adaptive management and the collection and evaluation of new or improved information. The shorter-term implementation programs developed within the framework of adaptive management may vary significantly from the programmatic snapshot of implementation. This is consistent with the theme of adaptive management and reflects the feedback and evaluation loops needed to refine and adjust the implementation program in the short-term.

Assumptions

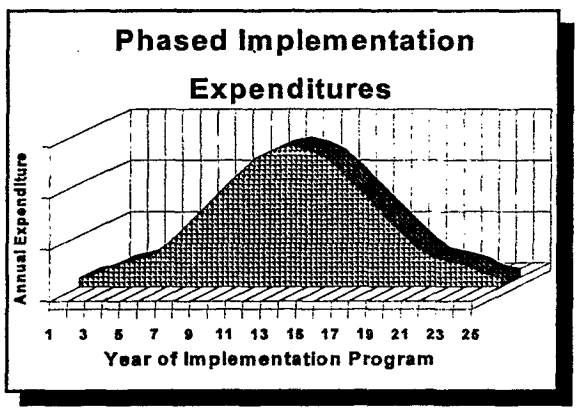
A number of assumptions are required to develop the programmatic level phased implementation program for the 25-year period after the programmatic Environmental Impact report/Statement is certified. These assumptions are important elements of the *Strategic Plan* and will guide and assist in the development of a process for implementing the ERPP. The assumptions include: the assurances package for the ecosystem restoration, funding and financial strategy, ERPP implementation strategies, focus area and tiered emphasis for implementation, preferred alternative for storage and conveyance, integration with the other common programs and development of a conservation strategy.

Funding

The total for implementing the ERPP has been very roughly estimated at $1.5 billion. About half of that is available through Proposition 204 bond and expected federal appropriations. These funds will be used to provide the initial infusion of capital to move the implementation program forward. In later years, the magnitude of the annual implementation program may be constrained by the annual availability of funding. Phasing, and the overall adaptive management program, is ultimately influenced by the availability of restoration funds throughout the duration of the program, individual and cumulative costs to

implement the ERPP, and priority strategies that select for specific actions to reach specific targets.

This ERPP assumes that the $390 million identified in Proposition 204 will become available after the CALFED Bay-Delta Program's final EIR/EIS is formally adopted by the CALFED agencies through the filing of a Record of Decision for the federal EIS and certification of the EIR by the California Resources Agency by late Fall 1998. It is assumed that these funds will be encumbered and spent during a 25-year period which provides a pro-rated fund availability of approximately $15 million per year. The projected expenditure of funds will likely follow a bell-shaped curve (see inset). This is necessary to develop the infrastructure needed for implementation, monitoring of indicators, focused research, and post-project evaluations.



It is also assumed that expenditures in any single year will not be limited if suitable projects exist for implementation. Category III is assumed to complete the expenditure of $180 million during the first five years on actions identified for early implementation.

Other sources of funding available during the early implementation phase include $429 million which may be available through a series of federal appropriations.

It is also assumed the CVPIA will continue to be implemented and that an estimated $20 million to $35 million per year for 25 years ($500 million to $875 million estimated total) will be spent on restoration actions, most of which will be closely related or identical with actions in the ERPP.

Implementation Focus Areas

The geographic scope of the ERPP is defined by the interdependence and linkage of watersheds, streams, rivers and the Bay-Delta and the complex life histories of the dependent fish, wildlife and plant communities. The restoration of ecological processes requires implementation of actions throughout much of the Central Valley, its upper watersheds, the Bay-Delta, and near-shore ocean. The primary geographic focus is the Bay-Delta, the Sacramento River, the San Joaquin River, and their tributary watersheds directly connected to the Bay-Delta system below major dams and reservoirs. Secondarily, the ERPP addresses, at a programmatic level, the near-shore ocean, South San Francisco Bay, lower San Joaquin Valley, and the upper watersheds above the major dams.

The primary geographic focus area for the ERPP is divided into 14 zones, each characterized by a predominant physical habitat type and species assemblage. These 14 ecological zones constitute the geographic areas in which the majority of restoration actions will occur.

Tiered Emphasis

The CALFED approach to the development of ecosystem restoration targets and programmatic actions in the ERPP study area varies by area. These areas receive varying levels of specificity and emphasis.

Example of Phased Implementation for Ecological Processes

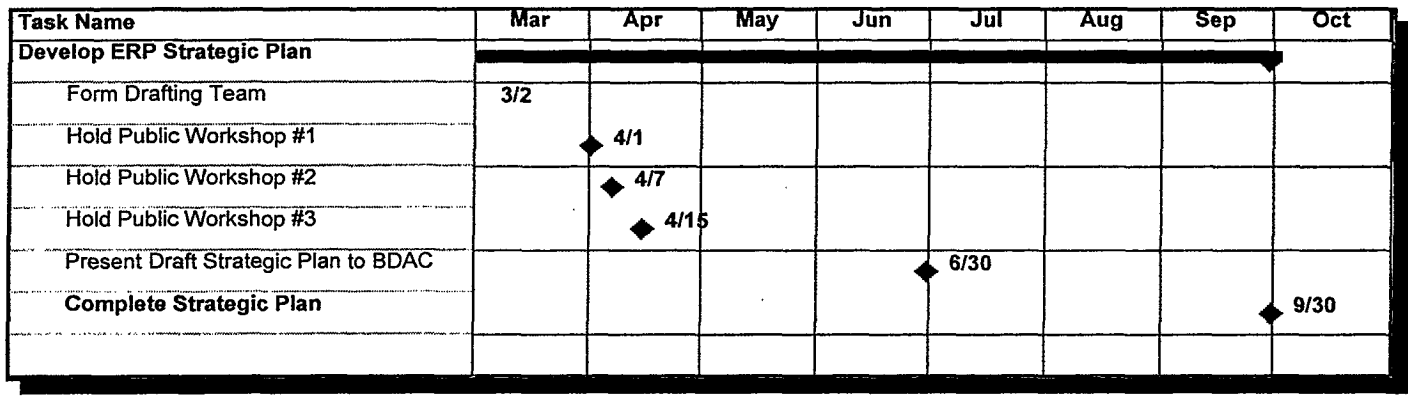
Ecosystem Element	Implementation Interval (Years)				
Ecological Processes	1-5	6-10	11-15	16-20	20-25
Streamflow	■	■	■	▨	▨
Sediment Supply	■	■	■	▨	▨
Meander Corridor	▨	▨	■	■	▨
Floodplains and flood processes	▨	■	■	▨	▨
Stream Temperatures	■	■	▨	▨	
Bay-Delta Hydraulics		▨	■	▨	▨
Bay-Delta Aquatic Foodweb				▨	▨
Upper Watershed Support		▨	▨	▨	

Key		
Level of Effort	Code	Description
High	■	High level of implementation, monitoring, or focused research.
Medium	▨	Medium level of implementation, monitoring, or focused research.
Low		Low level of implementation, monitoring, or focused research.

Implementation Management

One of the most difficult challenges in the administration of the ERP is the potential design of the necessary institutional arrangements to ensure implementation of a large program over a long time period (25-30 years). Although the design and structure of the implementation entity for the ERP is not a focal point in developing this Strategic Plan, it is an important activity occurring outside of the ERP. Some of the important issues to be addressed include fostering a regional perspective, utilizing a "Problemshed" orientation, clearly defining the function of the implementation entity which will then define its structure, integrating strong mechanisms for full accountability of the program, and avoiding a fixed approach to implementation by promoting flexibility and creativity.

Timeline for Developing the Strategic Plan



DRAFT OUTLINE OF THE STRATEGIC PLAN

This preliminary draft outline was prepared by a group of interested stakeholders and CALFED staff. We recognize that successful implementation would only occur if the agencies, stakeholders, and local interests share the same vision for implementation. We also utilized the many insightful comments from reviewers of the ERPP and the Scientific Review Panel. This plan will be further refined and implemented with the input and guidance of stakeholders, agencies, and all interested parties.

1. **Executive Summary**

2. **Introduction**
   a. Problem Statement
      i. Scientific uncertainty, urgency of restoration
   b. Mission Statement
      i. Outline the principles that CALFED and the core team will follow in developing the plan, with an emphasis on public and scientific input
   c. Purpose and Overview of Strategic Plan
      i. Relation to other volumes of the ERPP
   d. Integration with other CALFED Bay-Delta Program components
      i. Restoration Coordination Program, Conservation Strategy
   e. Definition of Terms
      i. This step is necessary to address, in part, the scientific review panel's first recommendation: "In revising the ERPP, CALFED should clearly state whether the goal of the project is restoration or rehabilitation and name the document accurately . . . The decision to restore or rehabilitate need not be made on a system-wide level – it could be made for individual watersheds or ecological zones. . . This distinction between "rehabilitation" and "restoration" is one among several examples of the need for refining the use of phrases and terms in the ERPP. . ."

3. **Ecosystem Strategy**
   a. This is the overarching ecological planning framework for the ERP. Describe the general structure of the plan, specifically the stair step concept of moving from:
      - ecological principles; to
        - goals; and
          - objectives; supported by
            - analytical tools; which ultimately guide the selection of
              - strategies.

i. Guiding Ecological Principles

(1) Briefly present the key ecological principles used to guide the selection of goals and strategies to attain the goals. They form the underpinnings of the restoration/rehabilitation plan. These are purely scientific, not management principles.

ii. ERPP Goals and Objectives

(1) Revise existing ERPP goals and identify two to five overarching program goals. (This step is necessary to address the second recommendation of the scientific review panel: "Simplify and focus the presentation of the program and its goals on the basis of conceptual models. The goals should be explicitly, quantifiable, and attainable." This step is intended to set explicit, quantifiable goals. Section IV of this outline addresses presentation of the program and its goals through conceptual models.)

(2) Each goal should be supported by several specific, quantifiable objectives. Quantifiable objectives are the end points which define success of the restoration effort. Goals have not yet been identified but will be discussed and agreed upon by the CALFED Policy Group and BDAC Ecosystem Restoration Work Group.

Example ERPP Goals

Goal A	Maintain and Restore Ecological Function
Goal B	Protect and Restore Native Species
Goal C	Maintain and Enhance Viable Populations of Selected Species for Safe and Sustainable Consumptive Use
Goal D	Maintain and Restore Fully Functioning, Self-Sustaining, Representative Habitats and Ecosystems
Goal E	Conserve Naturally Functioning Ecosystems

4. Bay-Delta Ecosystems: Descriptions, History, and Conceptual Models

a. This Chapter will provide a picture of the system (past and present) and present a series of conceptual models that describe current theories on how the system functions and how various factors (including stressors) influence the system. The conceptual models combined with the guiding ecological principles described in Chapter 1 will form the rationale, or logic, for how specific strategies and actions are expected to help in achieving the ERPP goals. This chapter will provide the scientific framework for the ERPP. The chapter synthesize and provide additional scientific support for the ecosystem descriptions presented in Volumes I and II.

i. Ecosystem Classification
   (1) Provide a description and ecosystem classification of the Bay-Delta system. Include major structural characteristics, processes, and organizational features. Describe specific habitats and linkages between habitats at a landscape level.

ii. Key Attributes
   (1) Identify key system attributes including hydrology, geomorphology, habitat types, biological communities, and energetics/nutrients. A draft ecological attributes paper was prepared by the Indicators Group.

iii. Historical Conditions and Human Interventions
   (1) Provide a description of the watershed and its ecosystems as they existed prior to massive human intervention; circa 1800. Discuss major human interventions over time.

iv. Current Status and Trends
   (1) Describe the present system. Clearly identify the difference between existing conditions and ERPP goals. Discuss causative factors creating and/or maintaining these differences including documented cause-effect relationships, suspected cause-effect relationships, and controllable vs. uncontrollable factors.

v. Hypotheses and Conceptual Models
   (1) Describe conceptual models that explain the current theories regarding how the system works and how various strategies will achieve the restoration goals. Flesh out the specific testable hypotheses implicit in the conceptual models. Cite the evidence or assumptions underlying these hypotheses. (This step is necessary to address the fourth recommendation of the scientific review panel: " In order to utilize science as a basis for the adaptive management system, there is a need for the development and use of models of physical and biotic ecosystem processes with links to key biotic components.")
   (2) Preliminary conceptual models for the ecosystem were developed by the Indicators Group.

b. Analytical Tools
   i. Describe the analytical tools that have been, or should be, used for refining specific objectives and designing strategies and treatments proposed for ecosystem rehabilitation and restoration. These tools should be based on the ecological principles established in Chapter 1 and should be used to develop and justify quantified endpoints.

c. Strategies For Restoration and Rehabilitation
   i. Describe the strategic approach(es) and individual strategies types of actions for achieving program goals. Describe how and where these strategies will be employed in the various ecosystem types (i.e. delta vs. alluvial river) throughout the planning area. Identify key themes to convey ERPP goals and approach in layperson's terms.

5. Adaptive Management Strategy

a. Adaptive Management
   i. General Description of Adaptive Management
      (1) Define adaptive management and explain the need for adaptive management in the ERPP. To the extent appropriate, management actions should be designed as experiments.

   ii. Components
      (1) Describe the science components of the plan, including: focused research; modeling; and monitoring and how the adaptive management program will be developed from testable hypotheses. (This step is necessary to address the fifth recommendation of the scientific review panel: ". . . the adaptive management framework should be developed from testable hypotheses.")

b. Ecosystem Science Program / Scientific Review
   i. (This step is necessary to address the sixth recommendation of the scientific review panel: Accommodate "continual interaction of agency managers, agency scientists, and independent scientists" through the "creation of a scientific and technical advisory board, composed of agency scientists, stakeholder scientists, and scientists independent of the program.")
      (1) - Standing Science Body - Describe the form and function of a scientific and technical advisory body composed of agency scientists, stakeholder scientists, and scientists independent of the program. Activities to be carried out by the science body would include generation and reviewing hypotheses, formulating monitoring schemes, reviewing and interpreting data, and more.
      (2) - Independent Scientific Review Panel - Describe how outside scientific expertise will be embedded in the adaptive management process. Describe role of current Scientific Review Panel. (This step is necessary to address the third recommendation of the scientific review panel: "From the outset, the program should embed outside scientific expertise in the adaptive management process.")

c. Assessment Criteria and Performance Indicators
   i. Describe the designation, monitoring, and use of performance indicators to evaluate success of implementation measures in attaining program goals and objectives.

6. Implementation

a. Priority Setting
   i. Explain a process for prioritizing potential restoration actions due to biological urgency, feasibility, cost, and other criteria.

b. Conflicts and Constraints
   i. This section should include recognition of known or potential conflicts and constraints, including resource conflicts, socio-economic factors, and others.

c. Implementation Strategies and Conflict Resolution
   i. implementation strategies for each resource type and for geographic region; strategies for conflict resolution, such as only working with willing sellers, mechanisms for water transfers, financial incentives, and public involvement.

d. Implementation Plan
   i. Present an implementation plan framework with guidelines and considerations. The implementation plan will include the following items:
      (1) - 3 Year Action Plans (1st Action Plan prepared by Integration Panel/Ecosystem Roundtable);
      (2) - 25 Year Programmatic Implementation Plan

e. Institutional Structure and Decision Making Process
   i. Describe how decisions will be made regarding implementation of specific restoration actions, including the institutional structure that will be established to facilitate decision making. Describe the role of advisory bodies including the standing science body and independent scientific review panel discussed under the Ecosystem Science Program above. This chapter should be developed in coordination with the Assurances Work Group and others working on potential future institutional arrangements. Specific items covered should include:
      (1) - Implementation Entity(ies) and organizational structure
      (2) - Staffing expertise needed
      (3) - Funding requirements
      (4) - Legal authorities
      (5) - Endangered species compliance

Assurances and Finance
Issues

ASSURANCES AND FINANCE ISSUES

E-016541

CALFED
BAY-DELTA
PROGRAM

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Memorandum

Date: March 5, 1998

To: BDAC Members

From: Lester A. Snow
Executive Director

Subject: Assurances and Finance Materials and Discussion

Enclosed in this month's package is the "Implementation Strategy" and meeting summary notes from recent BDAC Assurances and Finance Work Group meetings. The Implementation Strategy describes the CALFED Bay-Delta Program's efforts to date on assurances, finance and overall Program implementation, as well as summarizes the efforts remaining in order to reach a final Program-wide Implementation Plan.

At the meeting we will focus on several specific areas of concern for implementation. For assurances we will examine the role of stakeholder involvement in implementation, how to assure consistent Program-wide implementation, what concerns arise with respect to implementing the ecosystem restoration plan, and whether a detailed staging plan provides an opportunity to satisfy stakeholder concerns and move forward to making a programmatic decision. For finance we will discuss the issues surrounding public and private funding of the Bay-Delta solution.

Enclosure

DRAFT IMPLEMENTATION STRATEGY
February 15, 1998

The CALFED Bay-Delta Program is developing a long-term comprehensive plan to restore the ecological health of the Bay-Delta and improve water management for beneficial uses. Once the CALFED agencies select a plan, they will need an implementation strategy that assures the plan will be implemented and operated as agreed. In addition, the CALFED agencies will need a contingency response process to address situations where an element of the solution cannot be implemented or operated as agreed.

Below is a summary of the implementation strategy for program-wide implementation including finances and financing. Additional work on this strategy will become increasingly important as the agencies and public contemplate selection of a preferred alternative and release of a final environmental impact statement and report at the end of 1998.

ASSURANCES

Assurances are the mechanisms necessary to assure that the long-term Bay-Delta solution will be implemented and operated as agreed. In addition, an assurances package will include a contingency response process to address circumstances in which an element of the long-term solution cannot be implemented or operated as agreed. This is a status report on the development of the Assurances package and will address the process used to identify the building blocks that will make up any assurances package, remaining issues and a suggested process for completing an assurances proposal for the final programmatic EIS/EIR.

Process

During Phase II of the Program a work group, appointed by the Bay Delta Advisory Council (BDAC), identified and discussed a number of issues relating to development of the Assurances package. These discussions occurred at public meetings approximately every six weeks and included BDAC members, CALFED agency representatives and members of the public.

Early in their discussions, the work group determined it was necessary to develop a case-study in order to focus their discussions. The work group selected an alternative that presented multiple assurances issues. The selection of the case study was in no way an endorsement of any program alternative or approach.

Periodically, CALFED staff or BDAC members presented updates to the full BDAC on the work group's efforts. The work group process and resulting discussions at BDAC have identified the building blocks necessary to construct a package of assurances. Neither the work group nor BDAC have identified a single assurances proposal that addresses every concern, or satisfies every interest group. A significant amount of work remains, therefore, to craft a

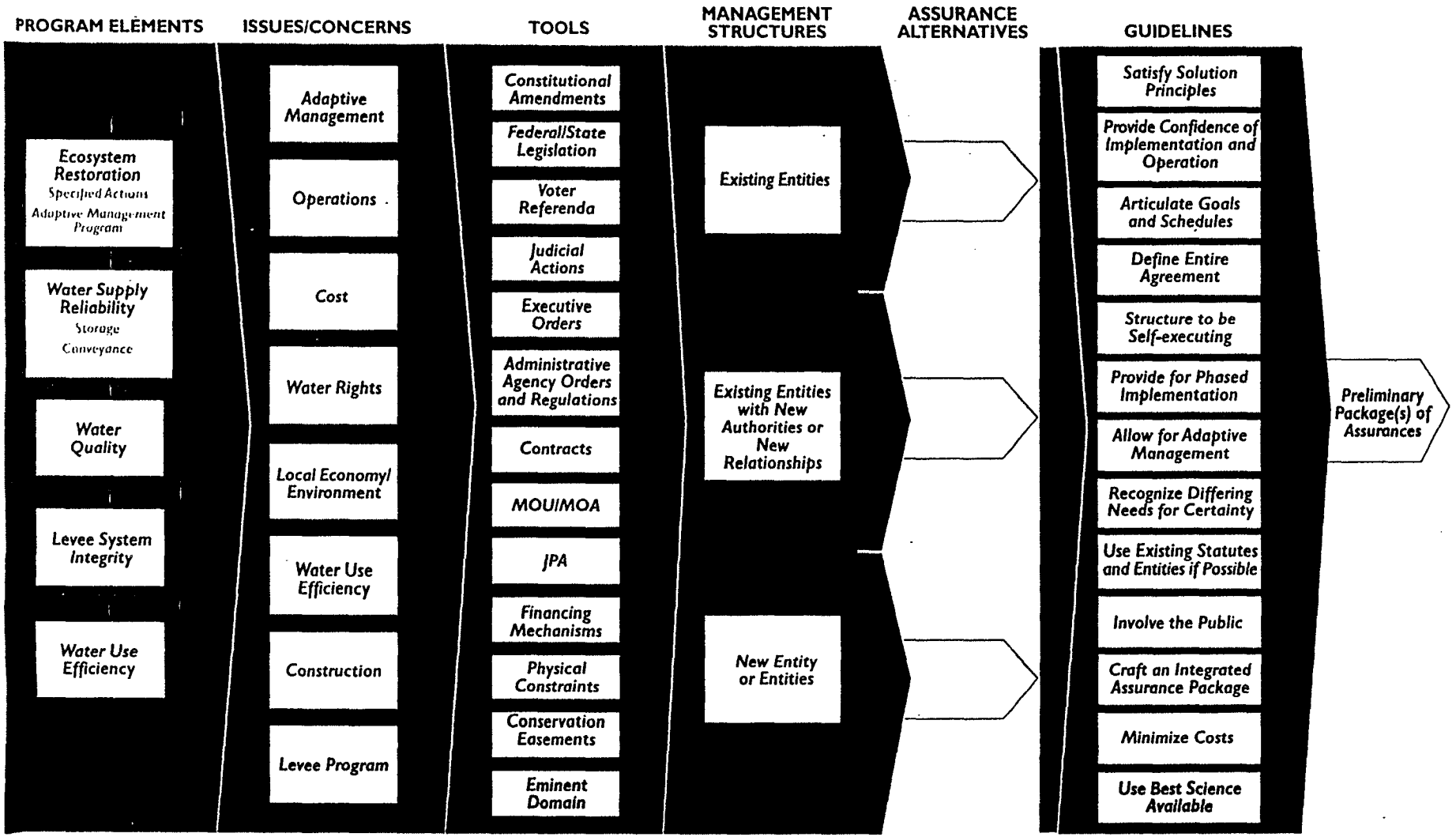
package of assurances prior to completion of Phase II of the CALFED Bay-Delta Program. Without a sound assurances proposal, implementation of any preferred alternative is uncertain.

In addition, the Program is developing implementation plans for each program component. The task for assurances will be to collect these individual implementation plans into a coordinated program-wide implementation strategy that will also include assurances and financing.

Building Blocks

Because the long-term CALFED solution will be a complex program addressing differing resource areas (ecosystem restoration, water quality, water supply reliability and levee and channel integrity), it became evident to the work group that differing program elements may require differing types of assurances. In addition, it also became clear to the work group that different program elements raised differing concerns among stakeholder communities. The CALFED staff and work group thus identified the program elements that needed to be assured as well as the issues and concerns raised by process participants. They discussed the many differing tools available for use as assurances tools including the choice of who implements the program. Finally, the staff and work group developed a list of guidelines against which to measure any assurance proposal in order to assess the merits of the proposal. Each step is briefly summarized below and shown at Figure 1. Additional detailed information on any of these steps is part of the Assurances Work Group and BDAC briefings materials available from the CALFED Bay-Delta Program.

IMPLEMENTATION: ASSESSING ASSURANCES



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Program Elements

The program elements to be assured are as follows:

- Ecosystem Restoration - including both specified actions or programs, as well as a significant adaptive management program.
- Water Supply Reliability - including both storage and conveyance programs.
- Water Quality.
- Levee and Channel Integrity.
- Water Use Efficiency.

Each provides its own set of assurances challenges. For example, the concerns over appropriate adaptive management for ecosystem restoration may require differing assurance mechanisms than do assurances for constructing additional offstream storage reservoirs. Each program element, therefore, was analyzed both in terms of how to assure it individually, as well as how to assure it as part of implementing the entire long-term solution.

Issues and Concerns.

Many of the program elements present unique issues of concern to CALFED agencies and stakeholders alike. Some of the issues of concern follow:

Adaptive management - A significant portion of the Ecosystem Restoration Program element relies on adaptive management to determine specific restoration actions and measure their efficacy. Therefore, assuring effective adaptive management becomes essential to assuring successful implementation of the Ecosystem Restoration Program. The difficulty is that adaptive management by definition is flexible. The challenge is to provide adequate and appropriate assurances that an adaptive management system has all of the basic authorities and resources to operate effectively without overly restricting the directions such a program may take.

Operations - How a water conveyance or storage facility is operated can mean the difference between a facility providing benefits to many beneficial uses and one providing no benefits, or benefits to one user group at the expense of another. CALFED will identify a process that will lead to agreement on operations to

provide benefits consistent with stated Program purposes. Fear of misoperation is of paramount concern for many stakeholders.

Cost - One of the concerns over whether or not the long-term solution can be implemented and operated as agreed is assuring adequate funds are available.

Water rights - How and whether the long-term solution will affect area of origin claims, and existing and future water rights, creates concern on the part of some stakeholders.

Local economies and environments - Many stakeholders are concerned with how a long-term solution might affect local economies and environments. If, for example, local land uses change because of restoration efforts, what will the affect on the local economy be? Likewise, if a long-term solution increases water transfers, what will the affect on local environments be?

Voluntary water use efficiency - Some have expressed concerns that voluntary water use efficiency measures are virtually impossible to assure.

Construction - Because of the programmatic environmental review, most construction associated with a long-term solution will probably require additional site-specific environmental review and permitting. The uncertainty of these future processes causes concern among stakeholders that assuring future construction is difficult.

Support for levee program - Levee stabilization and improvements require a significant investment of money. Many are concerned that support for such a program may vary depending upon the level to which water users rely on water from the delta common pool.

Consistent vision throughout implementation - Many stakeholders are concerned that program components must remain linked throughout implementation.

Tools.

The staff and work group developed a list of tools and generic descriptions of them. Although some tools provide greater certainty, they may also be more difficult to establish initially, or may cost significantly more than another tool. Selection of specific tools, therefore, will be an assessment of risk and willingness to pay to minimize that risk. In general, the staff and work group identified the following tools:

Constitutional Amendments. Federal or state. Article X §2 of the California Constitution, for example, calls for the reasonable and beneficial use of all water.

Constitutional amendments are difficult to obtain and difficult to modify once obtained.

Statutes. Federal or state. Examples of statutes that govern management of a resource include the state and federal endangered species laws, state and federal water quality statutes (Porter-Cologne Act and the federal Clean Water Act), area of origin protections, state and local land use statutes and the federal Central Valley Project Improvement Act. Statutes may be modified by act of Congress for federal statutes and by the Legislature for state statutes.

State voter referenda. Voter referenda can be used for a variety of purposes, but the most common are to enact particular legislation (such as Proposition 13 which enacted constitutional and statutory limits on local financing and property taxation) or to approve particular bond measures (such as the series of California Parks and Wildlife bond measures or the bond measure funding Bay-Delta ecosystem measures (Proposition 204). Modification of voter referenda is normally more difficult than modifying statutes, and at a minimum requires action by the Legislature.

Regulations. Federal or state. Adopted by administrative agencies to guide implementation of their duties and obligations. An example is the California Environmental Quality Act (CEQA) guidelines. Regulations are proposed by federal or state agencies and subject to public review and comment prior to adoption. Regulations may be modified by administrative agencies.

Judicial actions. Federal or state court judgments, orders, validations, consent decrees, stipulated judgments. Can be modified only by future judicial decrees or statutory changes passed by Congress or the Legislature. Examples: the Racanelli decision on the 1978 Water Quality Control Plan and the California Supreme Court opinion in the National Audubon case, particularly the application of the "public trust" doctrine.

Executive orders. The President and Governor both may issue executive orders. The Governor issued an executive order to form the Water Policy Council, for example. Executive orders may be modified by action of the President or Governor.

Administrative agency orders. Examples are water right permits or permit amendments. Administrative agency orders are applications of statutes and regulations to a particular individual or group. They can be modified by subsequent order, but generally require notice and a hearing before the agency may do so.

Contracts. Legal agreements between two or more individuals or entities. Generally, no one party may unilaterally modify the terms or conditions of a contract. Enforcement may be specified in the terms of the contract and remedy for breach is available through the courts.

Memoranda of understanding/agreement. MOU/MOAs are interagency agreements with varying levels of specificity. Many are general agreements to cooperate that may be terminated at will by any party. Others are more specific and bind the agencies to a particular financial or programmatic commitment. The CALFED Agencies' MOU describing the roles and responsibilities of each agency with respect to preparation of the Bay-Delta Programmatic EIR/EIS is an example.

Joint powers agreements. State law authorizes public agencies (including federal, state and local agencies) to enter into agreements in which they "jointly exercise any power common to the contracting parties." Federal legislation would be needed to authorize a federal agency to participate in a joint powers agreement with a state agency although this may raise certain constitutional considerations.

Financing mechanisms. Various processes are available for generating capital and operating revenues. Water user fees are one example.

Bond measures. Provisions in the authorizing legislation or in the bond instruments could be used to establish Program requirements, schedules or related commitments.

Market incentives. Market forces can be used to encourage or discourage specific behaviors. For example, a water transfer market can create an incentive to use water more efficiently so that the unused portion can be sold.

Physical constraints. Constructing a conveyance facility to carry a specified amount of water is one example of a physical solution to an assurance problem.

Parallel implementation. Implementing elements of differing components in parallel processes might provide an assurance that one component is not completed before another is begun.

Public oversight/public involvement process. Public involvement, public advisory processes and dispute resolution mechanisms will be part of the assurances program.

New institutions. Created to implement, manage or fund any of the Program components.

Multiple species protection plans. A recent tool evolving out of the federal and state endangered species programs is the multiple species protection plan. These plans, which are usually called Habitat Conservation Plans (HCPs) under federal law, and Natural Community Conservation Plans (NCCP) under California law, generally preserve portion of a particular habitat for one or more species, and at the same time provide some certainty or stability for the public and private land owners by limiting future regulatory actions in the same area.

Programmatic permitting. Regulatory assurances could be provided in some circumstances but a programmatic permitting process for the CALFED Program, which would incorporate certain agreements regarding the actions to be required in the event of future regulatory constraints.

Guidelines.

The staff and work group identified a number of guidelines against which any assurance proposal should be measured. Those guidelines include the following:

- Satisfy the Program solution principles (implementable, durable, affordable, equitable, reduce conflicts, no significant redirected impacts).

- Provide high confidence that identified actions will be taken and that identified programs will operate as agreed. The Program will not guarantee outcomes. Additionally, the assurance package should not be used to compensate for perceived problems in the solution itself.

- Ensure that the solution contain clearly articulated performance criteria and proposed schedules for attaining Program goals.

- Specify that the written description of the long-term solution constitutes the entire agreement. Parties' unstated assumptions about the implementation of particular components should not be binding.

- Structure the solution to be self-executing. The CALFED solution, once implemented, should be minimally dependent upon discretionary actions by actors outside the solution framework.

- Include recovery mechanisms. The solution should contain internal mechanisms capable of responding to surprises and disappointments.

- Provide for implementation of the entire Program, even if that implementation occurs in stages or phases.

- Allow for adaptive management, wherever the current state of knowledge is inadequate to made definitive choices now.

- Allow for variations in the need for certainty on discrete program components. Some parts of the Program may need to be "set in stone," while others may require a more flexible approach. The assurances, therefore, may vary in nature, scope and extent among program components.

- Work within existing statutes, regulations and institutions where feasible.

- Involve the public in decision-making. In order to maximize the likelihood of continued public support, the solution should contain mechanisms for soliciting, influencing and responding to public opinions.

- Craft an integrated package of assurances that work well together. Although assurances may differ by program component, they must function smoothly together. This effort is intended to assure implementation of the entire program.

- Minimize costs. The proposed assurance package should be structured so as to provide the necessary assurances at the lowest possible cost.

Issues

Program staff have identified a number of significant assurance concerns relevant to the alternatives being analyzed in this EIS/EIR. A brief summary of some of these concerns follows:

Institutional arrangements including a new implementing entity for ecosystem restoration program. Many stakeholders are concerned that the existing diffused approach to ecosystem management and restoration with responsibilities resting in state, federal, local and private entities is inadequate to assure implementation of the ERP as envisioned. Program staff, therefore, is examining institutional arrangements including a new entity.

Any implementing entity would have the powers and resources necessary to implement the ERP. In addition, the decision of how and by whom new actions in the remainder of the program will be implemented is also pending. Program-wide coordination throughout the implementation phase is essential to successfully implementing the entire program. A decision on an ecosystem entity cannot be made without considering the remainder of the program.

Ongoing stakeholder involvement. Many stakeholders are also concerned with the nature and scope of their involvement in the implementation phase of the Program. The almost unanimous opinion expressed at BDAC Assurances Work Group meetings is that stakeholders would like to weigh in on decisions and advise agencies in a meaningful and timely manner throughout implementation. For some stakeholders this concept is

expressed in stakeholder representation on the governing board of whatever entity implements the ERP.

Coordinated implementation. The agencies and stakeholders are concerned that any decision regarding who implements the ERP must also consider how the remainder of the program is implemented. Because of the nature of the Program and the resource, it is impossible to implement program elements independently. Decisions about management entities must be reached at the same time in order to assure coordinated implementation.

Endangered species assurances. Many stakeholders are concerned with the nature and extent of assurances given to the recovery of endangered species and the assurances given to water users for protection from future regulatory restrictions on their activities. The overall concepts of "no surprises" is an important assurance for both the ecosystem and the water users. Program staff and stakeholders are examining California and federal endangered species laws to craft mutually acceptable assurances for the Bay-Delta ecosystem, as well as the water users.

Assuring appropriate operation of storage and conveyance facilities. Many stakeholders are concerned that construction and operation of an isolated conveyance facility will unacceptably alter the "common pool" conditions which currently provide export water users with an incentive to protect the delta levees and channels and maintain specified water quality standards throughout the delta. The stakeholders fear that if water could be exported without first passing through the delta that the delta itself could be harmed and that the incentives to continue to protect the delta will be smaller for those now receiving water from a conveyance facility isolated from the delta.

Although some stakeholders believe a small isolated conveyance facility presents overwhelming problems, many more believe that a large isolated conveyance facility presents greater problems as it provides greater capacity to move more water around instead of through the delta. Stakeholders worry that no assurance mechanisms can adequately prevent the future misuse of a large isolated facility.

Each of these descriptions is but a snapshot of a much larger and complex discussion that is continuing in the BDAC Assurances Work Group and elsewhere. Although it would be easier developing assurances after a preferred alternative has been selected, the above discussion should provide some insight into the importance of discussing assurance concerns while alternatives are being evaluated.

Completing an Assurances Package

Assurances Proposal

The Program is working to develop a package of assurances for the common programs. In addition, the Program is exploring options for assuring the variable

program components. The Program will continue working with BDAC and the BDAC Assurances Work Group to identify areas of agreement in a proposed assurance package. For areas of disagreement, the Program is identifying options that represent differing approaches for assuring a particular portion of the program. As a part of this effort, the Program is also developing a contingency response process.

Contingency Plan

It is impossible to protect the implementation of the long-term solution from every eventuality. The Program is developing a contingency response process to address circumstances where a significant program element cannot be implemented or operated as agreed.

Research on other complex resource management programs indicates that, regardless of planning, there is no way to anticipate and prevent all possible events that may interrupt or alter Program functions. The purpose of the contingency plan is to increase the potential for timely and appropriate restoration of Program functions when unforeseen events occur.

Over the next several months, the Program will begin developing a contingency plan that identifies broad categories of events and gauges their potential impacts on the Program, specifies how the Program will respond to them and defines procedures for resolving detrimental effects on implementation and operations.

Staging

Regardless of which program alternative or assurance package is selected, the CALFED agencies must determine how to implement the program over several years. Because the Program likely will require a number of funding, legislative, regulatory, contractual and institutional changes, implementation will be a complex process. Additionally, the size of the Program and the nature of the Program components make it impossible to implement the entire program simultaneously. The Program, therefore, must be implemented in stages.

The challenge in implementing a program in stages is to allow actions that are ready to be taken immediately to go forward, while assuring that each interest group has a stake in the successful implementation of the entire program over the implementation period. A staged implementation strategy, therefore, should have the following characteristics:

- each stage should be completed before the next stage can begin;

- each interest group should have strong inducements to support the completion of each and every stage; and

- program elements which are outside of the control of the CALFED agencies should be implemented as early as possible to reduce the risk that outside actors may affect implementation.

The Program has identified four stages to begin this effort:

Stage I - activities occurring between the present and certification of the final Programmatic EIS/EIR. This stage begins now and continues through certification of a final environmental document.

A. Draft individual implementation plans for each program component including:

   1. a description of the program element;

   2. a summary of the goals, objectives and targets the element is seeking to achieve;

   3. a detailed description of the actions to be taken, the tools and strategies to be used and a schedule for implementing these actions. This section will include a description of the order in which actions should be taken and their relative priorities;

   4. a discussion of how and when success is to be measured and any other information necessary to assure timely and effective implementation.

B. Draft implementation document (plan or agreement) and circulate for agency and public review and comment. The document will be a compilation of all the actions necessary to assure program-wide implementation. The document should be as detailed as is possible in the time allotted.

C. Describe how the Program is to be managed in the near term.

Stage II - transitional period during which the Program moves from programmatic planning to implementation. This stage is projected to occur from about January 1999 - December 1999. As soon as possible following certification of the Programmatic EIS/EIR, the following would begin:

A. Introduce state and/or federal legislation necessary to implement the solution.

B. Draft contracts and agreements to govern implementation. This would include:

1. joint powers authorities, MOUs, MOAs, or other forms of agreement among the CALFED agencies; and

2. contracts between agencies and stakeholders.

C. Sign and execute a conservation strategy to address federal and state endangered species.

D. Establish a forum for discussions with members of the public throughout this stage.

E. Finalize the process to address circumstances which prevent key program components from being implemented or operated as agreed (contingency response process).

Stage III - near-term implementation. January 2000 - December 2000.

A. Establish a stakeholder advisory committee or oversight committee.

B. Begin implementing the levee stabilization program and emergency plan.

C. Complete site-specific analysis and seek permit authority.

D. Begin implementing ERP.

E. Implement ecosystem restoration monitoring plans.

F. Begin implementing water use efficiency and water quality programs.

Stage IV - long-term implementation. This stage is anticipated to occur from January 2001 - December 2030.

A. Establish long-term implementation authority and responsibility.

B. Assure program is being implemented consistently and in a coordinated manner. If all program components are not being implemented substantially as agreed, the process to address these circumstances would be triggered.

Clearly, the issue of assurances, particularly phasing, is paramount to achieving an acceptable long-term Bay-Delta solution. A great deal of additional work and refinement is necessary to craft a completed package of assurances. Assurances and related implementation strategy issues will be receiving more attention through the conclusion of CALFED's Phase II process.

FINANCING

Introduction

The Financial Strategy is a conceptual plan for funding the long-term solution (Solution) being developed by the CALFED Bay Delta Program (Program). This is a status report on the development of the Financial Strategy that identifies potential funding sources for the Solution. The potential funding sources discussed in this report are intended to apply to the Preferred Alternative (when selected), including Program Elements. Although the Preferred Alternative has not been selected, the funding sources might apply to any of the three proposed Phase II alternatives under consideration as well as the Program Elements. There may also be additional funding sources beyond those contained in this report.

Phase II of the CALFED process is designed to look at the long-term solution at the Programmatic level. The Programmatic approach determines the level of detail that will be available for purposes of formulating the Financial Strategy. Given this fact, this report will focus on concepts and ranges of costs rather than specific numbers and dollar amounts. Specific amounts are important, but they will be introduced in Phase III of the CALFED Bay Delta Program, in which project-specific information for each component will be prepared.

Process

During Phase II of the Program, a work group appointed by the Bay Delta Advisory Council (BDAC) identified and discussed a number of issues relating to development of the Financial Strategy. These discussions took place on a monthly basis at public meetings held in several different locations in the State. One or more BDAC members, Program staff, State and Federal agency representatives, interested stakeholders, and members of the public generally attended the meetings.

The work group was formed to identify, examine, and offer recommendations concerning policy issues. In this role, the work group identified what it considered to be the most important issues relating to the Financial Strategy. Much of the discussion was of necessity conducted in the abstract, because detailed information on the costs and performance of the alternatives was not available to the Work Group.

The work group approached the issues in an iterative manner by considering a set of Financial Principles proposed by staff to guide future detailed decisions on the Financial Strategy. The discussions of the issues and Financial Principles identified by the work group are the source for this report. The next section of this report describes the Financial Principles that have been discussed. In some cases more detailed discussions have taken place regarding the application of these principles to the Solution. These discussions are described in the component-specific sections later in this report.

Financial Principles

- **Benefits-based allocation**

Sharing the costs of the Solution based on the benefits being created is the cornerstone principle of the CALFED Financial Strategy. The fundamental philosophy is that costs will be paid by the beneficiaries of the actions, as opposed to seeking payment from those who, over time, were responsible for causing the problems being experienced in the Bay Delta system.

Among State and Federal agencies and within the stakeholder community, there is general agreement with this benefits-based approach as a guide for future cost sharing, although some cost obligations for past impacts may be appropriate. A number of questions remain to be answered concerning the application of this principle.

Some benefits created by the Solution are difficult to quantify. Benefits associated with restoring ecosystem health, for example, are not measurable in the same way as the benefits of water supply improvements. This implies that while the benefits-based approach is useful as a guide, benefits cannot be used in a strictly quantitative way to arrive at an answer regarding sharing of costs.

Also, even though they agree in principle with the benefits-based approach for future costs, some stakeholders feel that direct beneficiaries of water development, including water users, should pay something for past damage to the ecosystem prior to using the benefits approach for future costs. The essence of this concept is that a benefits-based approach for the future is only fair if all parties start out from an equal position. Some feel that reaching this "level playing field" would take an initial adjustment in favor of the ecosystem.

Assessing water users for this type of adjustment is difficult because there is not general agreement over what role any particular water diversion, or water diversions in general, may have played in degrading the ecosystem relative to the many other factors over the last century or more that man has been affecting the Delta. There exists a similar problem with other direct beneficiaries of water development. Water users also argue that they have already paid sufficient amounts over time to offset any past action This issue is discussed in more detail below in conjunction with the Ecosystem Restoration Program Plan component of the Solution.

The remaining questions that must be resolved relating to the benefits-based approach revolve around what to do when benefits cannot be quantified, and whether or not any adjustment for past impacts is appropriate prior to using the benefits approach.

- **Public/User Split**

During Phase I of the Program, it became apparent that both public money and user money are necessary to fund the long term Solution. The public and user categories have also been extended to describe the character of certain types of benefits which may be produced by the Solution, with an eye towards which source of funding will pay for certain portions of the Solution. In principle, public money will be used to do things that create public benefits, and user money will be used to do things that create user benefits.

Public money for the Solution means funding from the United States government and the State of California. The essence of the public money concept as a funding source is that it is money collected without being tied to the receipt of any specific product or service. State and federal income taxes may be the clearest examples of sources of public money. Generally, public money is expected to be used to pay for aspects of the Solution which generate public benefits, as described below.

User money for the Solution refers to money which is collected in exchange for provision of a good or service. Fees paid for water service are a clear example of user money. Although it is clear that many of the water providers are public agencies, funds collected by these agencies in exchange for their services are not defined as public money for purposes of funding the Solution.

User funding for the Solution can come from a variety of sources, for example

- water user fees such as diversion or discharge fees;
- assessments; and
- access and license fees.

Generally, user money is expected to be used to pay for aspects of the Solution which generate user benefits and potentially for past impacts.

Benefits can be generally classified as either "public" or "user" based on the practicality of excluding individuals from access to the resource providing the benefit. If individuals can be effectively excluded from using the resource, then they can probably be charged for access to it. For some public benefit resources, one person's use can have a detrimental effect on the ability of others to use the resource. Resources of these type are called "common property" resources, to distinguish them from public resources that can be used by any number of people without depleting the resource.

Public benefits are generally those that are shared by a wide cross-section of the community and from which individuals cannot be realistically excluded. A public benefit is one that once you make it available to one person, it is available to all. Inability to exclude individuals means that imposing charges for access to the benefit is difficult. If "free riders" can access the benefits without paying, there is no economic incentive for

users to spend their money for these benefits. This means that if these benefits are to be created, public funding must usually be used.

User benefits are generally those that accrue to an identifiable subset of the community, and from which individuals can be excluded. The ability to restrict benefits to those that pay enables these benefits to be funded with user money. In some cases, such as metered water use, individuals can be charged based on volume of use. In other cases, such as access to recreational facilities, charges are based on simple access to the benefit.

The practical application of classifying benefits is in identifying which parts of the Solution should be paid for with public funds, and which with user funds. As a general policy, portions of the Solution that create user benefits, as defined above, should be self-supporting through the use of user money. User interests receiving the benefit should be charged for use of or access to the benefit.

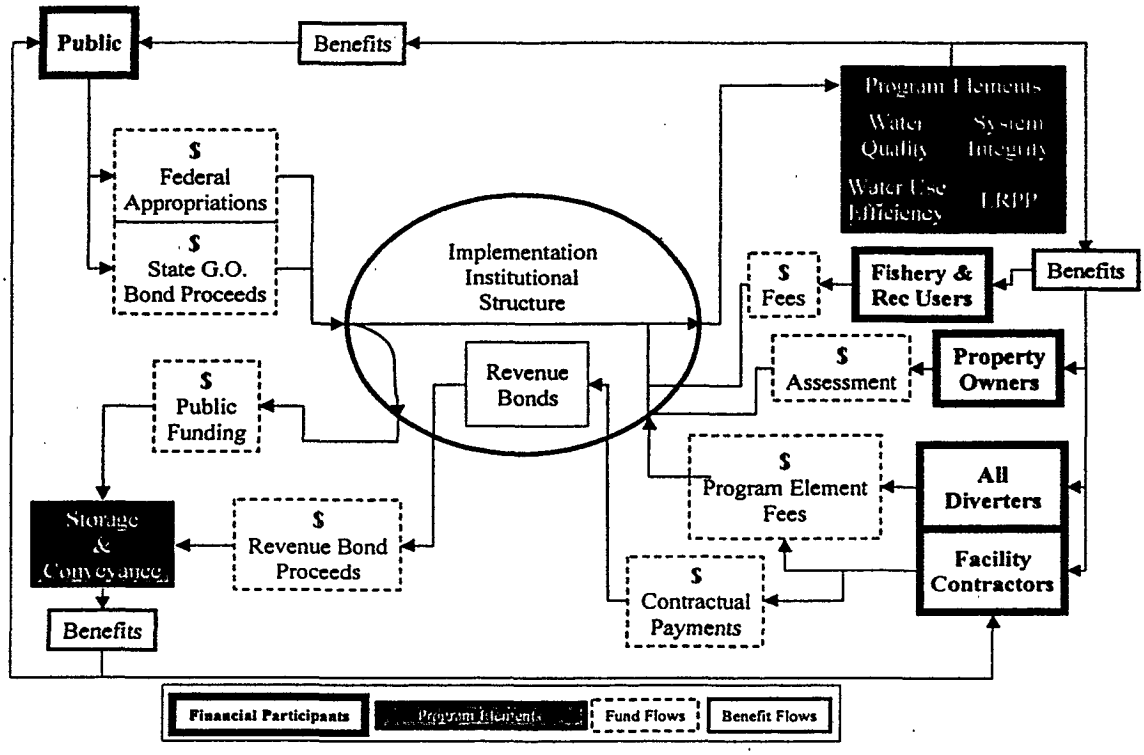
Public money should, as a matter of general policy, be used for those items that create public benefits. This includes those things that need to be done in the interests of the broader public, and create benefits from which it is not practical to exclude those that do not pay.

For both user and public funding, total solution benefits must be perceived to equal or exceed the costs in order to justify the expenditure.

Some of the immediate implications of the benefits-based approach and the public/user split are shown in Figure 1 below. Figure 1 is a hypothetical example of a funding structure for the Solution. There are many other possible structures, and there is no special significance to any of the features of this example structure. In Figure 1, benefits that flow out of the components of the Solution are broadly divided into those that accrue to the public in general, and those that accrue to a specific subset of individuals. For each subset of beneficiaries, a funding source has been identified that will allow that subset to contribute to funding those portions of the Solution that benefit them. Most people will find themselves in more than one box. They are both members of the general public as well as members of one or more identified user groups. The diagram also highlights the need for the institutional structure to be able to coordinate a number of funding sources as they are applied to multiple components and projects. It should also be noted that the Program will rely on continuation and redirection of existing funding sources as well as new funding sources.

Figure 1.

Finance Example Schematic Diagram



Another logical consequence of the benefits-based approach is an assumption that a broad-based revenue source will be needed to fund Common Programs with broad-based, but non-public, benefits. There has been no policy articulated in this area, but the discussion has been around a Delta watershed fee(s) that would provide a non-public revenue stream to supplement public funding for the Program Elements. This fee would include upper watershed users including San Francisco, East Bay MUD, Sacramento Valley and San Joaquin Valley, as well as in-Delta diverters. Substantive questions surrounding such a fee include the size of the fee, the basis on which it would be charged, and whether it should be uniform or differ by user group and whether state or federal legislation may be necessary to impose and collect the fee.

There are additional questions in defining public versus user benefits that arise in conjunction with benefits that are not clearly one or the other. Some user benefits are so widespread that the group sharing them is substantially the same as the general public. The keys to resolving this issue may lie in whether or not

access to the benefit can reasonably be excluded to those who do not pay for that access, and in whether future behavior can be beneficially affected depending on the choice of funding mechanism.

- **Ability to Pay**

This issue relates to whether or not specific users will be obligated to pay the full cost allocation for their benefits, or whether some obligations should be reduced based on the limited ability of certain users to those costs. Such reduced obligations would have to be subsidized either by other users or with public funds. A third option that must be considered is the possibility for reducing or eliminating benefits for those who are unable to pay for them.

In principle, users should pay their full share, with any exceptions to be considered on a case by case basis after a full cost allocation has been made assuming no ability to pay constraints. The concept is that any reductions in cost obligations based on inability to pay the full cost share should be explicitly identified and justified. Further discussion of this issue is included in conjunction with specific Solution components.

- **Crediting**

This policy relates to reducing Solution-related cost obligations to reflect payments made by obligees toward other parallel efforts to address Bay-Delta issues. An interim policy granting credit for cash contributed to the Category III Program has been approved by CALFED, but no additional provisions for long-term crediting have been approved.

In principle, all expenditures directed at the Bay-Delta system are part of the overall effort to improve that system. Coordinating or consolidating the parallel efforts to address Bay-Delta ecosystem issues has been advocated as an important step in ensuring effective and efficient use of the available funding for such efforts. Coordinating these efforts is seen as a way to expedite and implementation of many diverse and complex projects, as well as to enable flexible and efficient use of available funding. These issues are discussed in detail in the Assurances section of the Implementation Strategy. In principle, consolidation of these efforts for planning and funding purposes should include expansion of the crediting policy to reflect payments toward any of the consolidated efforts.

As part of the long-term crediting policy many additional details must be agreed upon, including the start date for crediting, types of payments to be credited, consideration of the timing of payments, and others.

- **Cost Allocation Methodology**

This policy relates to selection of particular cost allocation techniques for making detailed cost allocations within the sphere of a benefits-based cost allocation approach. No policy decision has been articulated here, although individual CALFED agencies have historical policies relating to cost allocation techniques. Within the stakeholder community, there is general consensus that while traditional methodologies may be applicable for conventional facilities, they may not be appropriate for use with the Program Elements due to the difficulty in including non-market benefits created by the Program Elements in the allocation process.

Certain terms need to be defined prior to discussing cost allocation concepts:

A ***project purpose*** refers to an objective or need that the project is designed to meet. Examples of project purposes include water supply, flood control, and ecosystem enhancement.

Projects that address only one objective are ***single purpose projects***. An example might be a flood control project, which addresses only flood control considerations. Cost allocation among purposes for a single purpose project is not an issue. Projects that address multiple purposes are called ***multi-purpose projects*** and raise the issue of cost allocation among the several purposes.

As a whole, the Solution is a multi-purpose project. However, individual actions included in the preferred alternative may be distinct projects that are single purpose. No determination has yet been made as to the level at which cost allocations will be made, although much of the discussion has centered on the Program Components. Each Program Component is multi-purpose.

Cost allocation is the process of distributing the costs of a multi-purpose project among the various purposes served. The cost allocation process becomes an issue when a project includes features that serve more than one purpose. The cost of such features is known as a joint cost, and the essential problem of the cost allocation process centers on the distribution of joint costs among purposes served. The goal is to develop a method that allocates these costs *equitably* among purposes served.

More than one person or group can share the benefits of each purpose. ***Cost sharing*** refers to how the costs allocated to each purpose are further split up among those who share in the benefits of that purpose.

Cost Allocation Method Selection Criteria

There are many possible cost allocation methods, each with its own strengths and weaknesses. The BDAC work group developed a set of conceptual criteria to guide the selection of methods for dividing the costs of the Solution. Selection of a specific method for each Component may be in order, and this selection will

probably involve tradeoffs among these criteria. There is no single best method that addresses all of the criteria in an optimal way.

Criterion	Description
Consistent	The costs allocated to a purpose should not change based solely on how the other purposes are subdivided or aggregated either initially or over time. In addition, effects of cost changes over time on the allocations to each purpose should be predictable and rational. For example, increases in total project costs should not lead to cost allocation reductions for some parties at the expense of larger increases for others. Costs allocated to the federal government related to ecosystem should not change based on whether all users are grouped together or treated separately as urban and agricultural.
Fair	All purposes and beneficiaries are treated the same in terms of receiving a reasonable share of the savings from the joint project. No special rules or calculations should be employed that would result in special treatment of a particular purpose. Joint projects are pursued because it is less expensive than pursuing separate projects to gain the same benefits. The crux of the allocation issues relates to joint costs: those that cannot be traced to a specific purpose. One way to look at the allocation issue is how to share the savings of the joint project versus the separate projects.
Flexible	The allocation method must enable addressing issues for a diverse mix of projects and programs that each may raise different issues For example, does the methodology must enable addressing the issues of fish screens, flood control measures, and recreational benefits? Each of these raise some specific issues.
Inexpensive	Using the cost allocation methodology should involve manageable costs for obtaining input data, performing cost allocation calculations, and developing results For example, SCRB requires costing out a number of scenarios that are never intended to be built for purposes of defining separable costs. This can be expensive.
Rational	Ability to charge each purpose at least as much as the cost of inclusion, and no more than the cost of going it alone
Reliable	The allocation methodology must employ proven techniques. Proven techniques are those that have been employed previously by CALFED agencies or others in similar situations and have been demonstrated to produce workable results.
Sufficient	The cost allocation methodology should assure recovery of full project cost. Marginal cost approaches are not designed to recover a set amount of money, and could end up recovering more or less than the cost of the project.
Understandable	Ability to explain the methodology and results in a manner that enables widespread comprehension and support of the methodology.

Description of Approaches

The BDAC work group reviewed three general types of cost allocation methodology, as described below.

- **Traditional Approaches**

  A 1954 inter-agency agreement on cost allocation between the Department of the Interior, the Army Corps of Engineers, and the Federal Power Commission agreed that three methods of cost allocation are acceptable:

  1. The **separable costs-remaining benefits (SCRB) method** is considered preferable for general application.

  2. The **alternative justifiable expenditure (AJE) method** is acceptable where the necessary basic data to determine separable costs are not available and the time and expense required to obtain the data are not warranted.

  3. The **use of facilities (UOF) method** is acceptable where the use of facilities is clearly determinable on a comparable basis and where use of this method would be consistent with the basis of project formulation and authorization.

- **"Follow the Water"**

  This approach would use the overall use or consumption of the water resource as a means of allocating costs. Although there are many complex details associated with this approach, the basic concept is simple. Costs of the Solution would be split among groups based on their proportional use of the water that flows into the Delta or would flow into the Delta but for being diverted.

- **Technical Approaches**

  This set of methods is based on a substantial body of academic research that has been developed over the past two decades on cost allocation. The thrust of these methods is to identify clearly the shortcomings of traditional cost allocation approaches listed above and to use mathematical or logical models to overcome those shortcomings in the interests of creating better, fairer cost allocation methods. Two technical methods were identified:

1. **Shapley Values** result in an allocation based on the average price of all orderings for inclusion of purposes in a multi-purpose project.

2. The **Nucleolus** approach is based on a repeated allocation of joint costs such that each pairing of two parties split the difference between the most and least favorable divisions to themselves holding other allocations constant, and maximizing the distribution of cost savings to each proper subset of parties.

Selection of Methodology

As identified above, the remaining issues that must be resolved with respect to cost allocation relate to selection of specific methods to use, and whether allocation should take place at the level of the composite Solution, or individually for each Program Element, or some other subset of the Solution.

Summary

While the fundamental policy direction for each of the Financial Principles discussed above has been identified, much work remains to be completed. Most of the remaining work is in the detailed application of these policies to a Preferred Alternative. Resolution of these issues will require the involvement of policy level representatives of Federal and State agencies and stakeholder interests. The process for moving these issues through the public and stakeholder process that has defined the Program to-date must be implemented during 1998 to enable resolution of these issues prior to finalization of the Implementation Strategy for the Preferred Alternative.

Program Element Funding

The discussion that follows addresses the components of the long-term Solution, identifying what is known for each program for the next ten years, and the types of issues that need to be addressed. Addressing the components individually does not alter the fact that the Solution must be implemented as a whole. Although individual funding sources may be earmarked for specific projects or components, the entire Solution must be funded with a package that is both adequate and reliable.

The specifics of the institutional structure that will be given responsibility for implementing the Solution may affect the ability to use some of the funding sources identified here. The options for this structure are not discussed here, although aspects of the structure that affect the funding alternatives are identified when relevant.

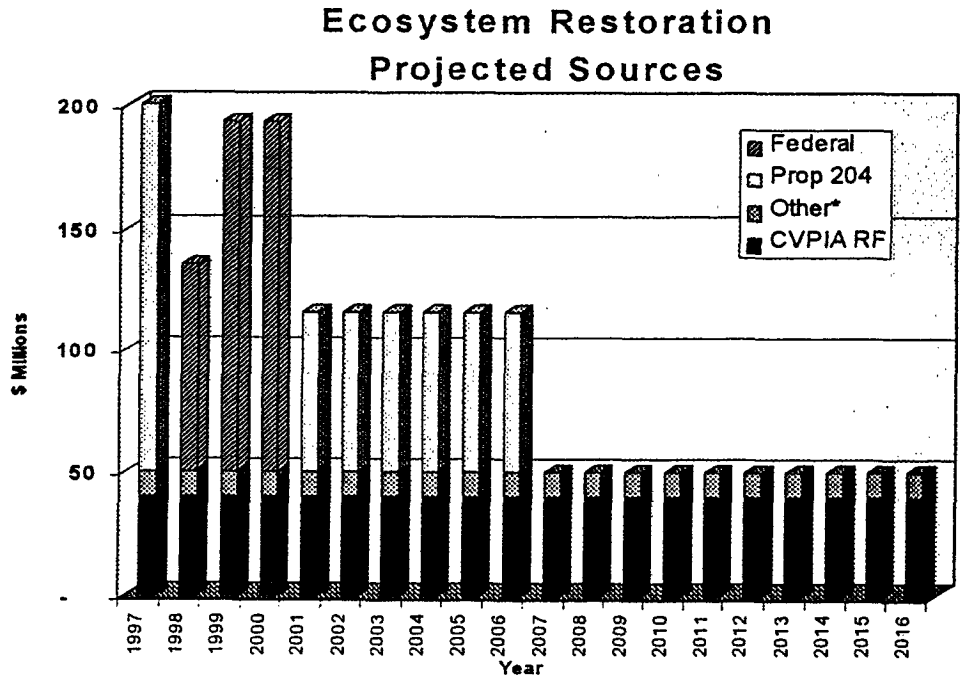
Ecosystem Restoration Program Plan (ERP)

The ERP is projected to cost a total of about $1.25 billion in 1996 dollars. While there has been no specific breakdown of this total by year, this total would translate into roughly $42 million per year over thirty years, excluding interest and inflation.

The ERP is the component of the Program that has the greatest identified funding potential at present. As Figure 2 shows, the ERP has potential for funding in excess of $100 million annually for the next several years. This level of funding is expected to be adequate for ERP capital through roughly the first ten years of the Program. The total ERP will require additional funding, but there is a saturation point for the amount of funding that can be put to effective use in any

single year. Additional ERP capital funding over and above the amounts shown, assuming these amounts are realized at the levels shown, are probably not needed until projected funding has been exhausted. In addition, funding for operations and maintenance for certain ERP activities must be provided. Actual funding levels are dependent on several factors, as explained below for each of the funding sources.

Figure 2



Federal Funding

Congress authorized initial federal funding of $143.3 million per year for three years in 1996. This funding is contingent on approval of annual appropriations by Congress. For Fiscal Year 1998, the first year of the authorization, Congress appropriated $85 million, as shown in Figure 2. Figure 2 assumes that future appropriations equal the full $143.3 million per year. This funding can be used for both capital and O&M funding.

Proposition 204

Voters in the State of California approved the sale of $995 million in General Obligation bonds Proposition 204 in November 1996 for various water-related purposes. The table below shows funding amounts contained within Proposition 204. The portions of this authorization that are specifically directed to the ERP (and included in Figure 2.) are italicized in the table below. Other provisions of Proposition 204 include funding for other Program Components.

SHORT TITLE	AGENCY	TOTAL AMOUNT ($MILLIONS)
CVPIA	F&G	93
Category III	Resources Agency	60
Levee Rehabilitation	DWR	25
South Delta	DWR	10
Delta Recreation	P&R	2
Bay Delta Program	DWR	3
Clean Water	SWRCB	110
Recycling	SWRCB	60
Drainage Management	SWRCB	30
Watershed Management	SWRCB	15
Seawater Intrusion	SWRCB	10
Lake Tahoe	CTC	10
Feasibility Projects	DWR	10
Conservation & Groundwater	DWR	30
Local Projects	DWR	25
Sac Valley Habitat	DWR	25
River Parkway	N/A	27
Bay Delta Program	Resources Agency	390
Flood Control	DWR	60
	Total:	**995**

The $93 million for CVPIA State matching funds and $60 million for Category III were immediately available, and projects to be implemented using these funds are being currently being examined. The assumption has been made that all of this funding will be committed in FY98. Availability of the $390 million is contingent on several things, including certification of the final Programmatic EIR/EIS, which is expected in late 1998. An assumption has been made for the purposes of Figure 2 that this $390 million fund would be spent in six equal annual installments of $65 million beginning after the last year of

federal funding in FY2000, although the funds are generally available in total once all of the conditions have been met.

Due to the fact that Proposition 204 relies on General Obligation bond funding, these funds cannot be used for O&M for ERP activities.

CVPIA Restoration Fund

The CVPIA Restoration Fund, which represents payments by CVPIA users including power users, is designed to address many of the same problems that the Program has identified (see Crediting section above) although there is not a complete overlap between the ERP and CVPIA Restoration Fund projects. Congress must also appropriate this funding, although existing law establishes the charges to CVPIA contractors and power revenues.

Other Sources

Other sources include user contributions to the Category III Program, the Four Pumps Agreement, and the Tracy Mitigation Agreement. These funds are estimated to total about $10 million per year. Like the CVPIA Restoration Fund, these sources are intended to address many of the same issues as the ERP.

Future Funding

As Figure 2 shows, after 2006 the amount of funding projected for the ERP on an annual basis decreases dramatically. ERP funding after this point is expected to come from renewed State and Federal sources as well as user sources. Securing the reliability of this future funding for both capital and O&M is a major issue within the Implementation Strategy. Another important assurance consideration is providing funding flexibility that is compatible with the Adaptive Management approach that is central to the ERP.

ERP User Funding

If a determination is made that user funding is appropriate for some portion of the ERP, existing contracts alone would not be adequate. Existing contracts do not cover all of the necessary parties that would need to contribute. Future contracts relating to any Program facilities are also likely to fall short for the same reason.

Although it has been controversial in the past, a fee on water diversions that encompasses the entire Bay-Delta System watershed appears to be the best tool to collect revenues directly from a wide cross-section of water users. Such a fee would cover not only contractors but also those who have an obligation to participate financially in the Program for other reasons.

The exact nature of this fee is somewhat dependent on the institutional structure that is put in place to implement the Program, but conceptually the fee would probably resemble the type of basin-wide fees that have been discussed

previously. Problems with prior proposals will have to be addressed and overcome as part of developing an acceptable structure.

Financial Baseline

There is a wide spectrum of views as to how the costs of the ERP should be shared that is based in part on differing views as to the starting point or "baseline" from which ecosystem improvements should be viewed. If such a "baseline" level were known, then restoration to that "baseline" level could be considered mitigation for past acts, while restoration above the "baseline" level could be considered enhancement to the ecosystem. Traditionally, mitigation actions are paid by those whose acts caused the need for the mitigation, while enhancement has been viewed as a responsibility of the general public. Unfortunately, no such "baseline" definition exists, and the ERP does not define a baseline in determining the goals and targets for restoration activities.

In the absence of an authoritative answer, possible viewpoints are wide-ranging. On one extreme end of the spectrum is the view is that all of the degradation of the ecosystem is due to modifications to the natural system, including dams, diversions, levees and other human interventions. This view implies that all restoration efforts would be seen as mitigation for human acts. The ecosystem cannot be enhanced by current restoration efforts, only returned to some decreased level of degradation. In the extreme, this view might suggest that the baseline predates human intervention in the Bay-Delta system ("Early Baseline").

On the other extreme end of the spectrum is the view that the degradation of the ecosystem is the cumulative result of centuries of diverse events, both natural and man-made. These events reflect an historical public policy based on a different set of societal values from those that exist today, and were endorsed by the State and federal governments. This view would suggest that the effects of past actions are impossible to evaluate, and that only changes from the current situation are relevant. In the extreme, this view might suggest that all improvements to the current ecosystem should be viewed as enhancements to the ecosystem, and no actions should be considered mitigation. This view would find the baseline date is in the present or very recent past ("New Baseline").

Resolution of the issue may have very real implications for allocating the costs of the ERP. An ERP example will illustrate this point, and further discussion of this issue is included regarding funding for storage facilities.

Habitat

The ERP includes acquisition of land for purposes of establishing new habitat. This type of action in the short term creates benefits primarily for ecosystem purposes.

The Early Baseline view would argue that establishing such habitat is only necessary due to reduction of historical habitat and reduced flows from human intervention. As such the costs of the habitat would be viewed as mitigation and would be paid by users.

The New Baseline view would allocate the costs to the general public as a result of the ecosystem enhancement benefits of the action.

Agreeing on the baseline in this example would determine to what extent users could contribute a portion of the costs of primarily ecosystem actions.

Needs of Affected Parties

Several of the affected parties have offered comments that reveal some of their underlying concerns over how this ecosystem baseline question is resolved. These parties may have additional needs beyond those listed here, and other groups may have different concerns that may need to be considered as well. In concept, this listing represents the issues that must be addressed adequately by the definition of the ecosystem baseline or elsewhere within the Program in a reliable way in order to allow the parties to agree on a baseline definition.

The thought to bear in mind in these discussions is that defining the ecosystem baseline in a certain way may not be the only, or the best, way to address the needs of the interest groups. Finding a different or better tool for addressing each need could reduce the conflict over definition of the ecosystem baseline and allow the equitable allocation of costs while at the same time meeting the needs of the affected parties.

Environmental Interests

There appear to be two key concerns among environmental interests concerning the ecosystem baseline. The first relates to ensuring adequate funding for the ERP, and the second relates to achieving a sustainable solution.

The funding concern relates to the unpredictable and limited nature of public funding sources. Were the ERP to be paid for using public funds only, it would be subjected to a continuing struggle for appropriations that could result in the funding being both limited and unreliable. Defining the ecosystem baseline in a way that places more of the burden on users could result in greater and more reliable funding for the ERP over time. The underlying need is to assure that the ERP has sufficient funding over time.

The sustainability concern relates to the fact that current water costs do not accurately reflect the full ecosystem impacts of water resource use decisions. This could result in decisions over time that could undermine the objectives and success of the Program, even if the initial Program appeared to be effective. Defining the baseline in a way that places more of the burden on users could result in a more accurate reflection of the costs of water resource use decisions

over time, resulting in decisions that would maintain or enhance the effectiveness of the Program over time. The underlying need is to incorporate the costs of ecosystem impacts in the price of water to an extent sufficient to reflect ecosystem costs of water use decisions.

Urban Interests

Urban interests appear to be primarily concerned with controlling costs. There is a limit to amount of money they can pay in total for the Program, and that includes any ERP costs that they might pay. This limit is based on a number of factors including the costs of alternative water supplies, political pressure to avoid rate increases, and concerns over the economic impact of rate increases within their service areas. The underlying need is for an acceptable total cost for Delta water. Urban interests are also concerned that total benefits they receive from the Solution justify their costs.

Agricultural Interests

Agricultural interests are also concerned with controlling costs, but they have slightly different factors to consider. There is a limit on what agricultural interests will pay based on the costs of alternative supplies and political pressure to avoid rate increases, but there is also a strict limit on what most agricultural users can pay based on the profitability of their crops. The chief agricultural interest might be best described as maintaining an ability to stay in business and achieve a reasonable return on their investment.

Levee System Integrity

The cost of the Levee Program depends both on the security level to which the levees are maintained and the geographic extent of the maintenance program. Raising all Delta levees to a P.L.99 standard would cost around $2 billion in 1996 dollars. A phased program that would strengthen levees to this level over time by prioritization is projected to cost about $30 million annually on an ongoing basis. Such a phased program would not result in all levees being upgraded to the PL-99 standard in the foreseeable future.

Proposition 204 extended funding for delta levees in the amount of $25 million dollars, and $60 million for Flood Control subventions. The full levee component of the Program will require additional funding. This funding is expected to come from State and Federal sources, local property owners, and water user fees. Local property owners will benefit from increased flood protection, while water users will benefit from reduced risk of interruption of diversions due to catastrophic levee failures.

In contrast to ERP benefits, which may take years to develop, levee benefits can be felt immediately. So, although much of the early ERP funding is from the State and Federal governments, implementation funding for the other Program Elements including the levee program needs to come from all parties. This suggests that fee structures for the other Program Elements need to be put in place from the start. Any fees assessed based on

property ownership would need to be approved by voters. Water users could be charged using the same type of fee structure discussed in relation to ERP funding.

A remaining issue with respect to the Levee Program relates to the fact that the cost of levee restoration in much of the Delta exceeds the value of the underlying land and its ability to generate revenue; and following the principle of beneficiaries pay, the costs imposed on landowners could be substantial. This raises questions about the willingness and ability to pay for Delta landowners, as well as the economic justification for the expenditures.

Water Quality Program

The Water Quality Program may have substantially lower early capital requirements than some other components, as it initially consists more of research, monitoring, and education activities. Significant funding over time for land conversion related to drainage issues may be expected. The Water Quality Program is expected to eventually cost about $750 million in 1996 dollars. On an annual basis for the first ten years, approximately $25 million per year will be required for this program.

State and Federal funding, combined with user fees are expected to provide for this program. As with the Levee programs, these fees need to begin immediately with the commencement of the Program.

Water Use Efficiency Program

The Water Use Efficiency Program also has lower early capital requirements than some other components. The Water Use Efficiency Program is expected to eventually cost about $750 million in 1996 dollars. On an annual basis for the first ten years, approximately $25 million per year will be required for this program.

Like the Water Quality Program, State and Federal funding, combined with user fees are expected to provide for this program. These fees need to begin immediately with the commencement of the Program.

Storage and Conveyance Facilities

The costs for Storage and Conveyance facilities estimated to total $2 to $8 billion in 1996 dollars depending on the type and number of facilities included in the Solution. The bulk of capital construction costs will of necessity come later, most likely after the initial ten-year period. This is due to the longer planning, design and permitting process associated with these types of actions. Planning costs for selected facilities would begin immediately after selection.

Storage and Conveyance facilities have been assumed to be operated to address both user and ecosystem needs. For this reason, funding is expected to come both public and user sources. How to divide the costs between users and the public is in question. The issue is related to the ERP baseline issue discussed in the ERP section. Storage costs, like some ERP costs, can be considered as

enhancement or mitigation, depending on your point of view. The following example illustrates the issue.

North of Delta Storage

New storage north of the Delta within the Program alternatives is assumed to be used jointly for ecosystem and water supply purposes. This would involve diverting water into storage during periods of high flow, and releasing some of the water when needed for users= diversion purposes and some when needed to supplement in-stream flows for ecosystem purposes.

The New Baseline view (as defined in the ERP section baseline section) would treat the portion of the costs of the new storage that were to be used for ecosystem as an ecosystem enhancement, suggesting that those costs should be borne by the general public.

The Early Baseline view would argue the water diversion to a storage facility cannot be considered ecosystem enhancement, as the best use of water for the ecosystem is to let it remain in the river in its natural condition. Any diversions, even if intended to be used to supplement dry year flows for the ecosystem, are only necessary because the natural flows have been disrupted by human actions. Had the natural flows not been disrupted, dry years flows would not unduly stress the ecosystem and flow supplements from storage would not be needed. Thus any costs related to ecosystem storage should be considered mitigation, according to this view, and paid by users.

Agreeing on the baseline in this example determines to what extent public funds could be used to pay a portion of the costs of new storage.

Future Funding Timing

Although any federal contributions to the funding of Storage and Conveyance facilities would be expected to be made at the time of expenditure, both any State and user contributions are likely to be financed with through bond issues. This changes the out-of-pocket cash expenditures, due to the fact that State and user costs would be based on making annual debt payments, probably extending over 30 or more years, as opposed to up-front payments.